New Hampshire Institute for Local Public Health Practice
at the Manchester Health Department

Applied Communicable Disease Investigation, Control, and Microbiology

Course Description:

This course will provide an introduction to the basic principles within microbiology, immunology, and serology, such as the nature of microorganisms, disease and resistance, and laboratory testing. This course will also cover the epidemiology of specific disease causing bacteria, viruses, parasites, protozoa, and other microorganisms. Definitions and reporting in communicable disease, and transmission of disease in relation to control strategies will also be explored.

Course Objectives:

Students who successfully complete this course will be able to:

- Describe the historical and scientific discoveries that led to the control of communicable diseases.
- Understand the scientific nomenclature used to describe microorganisms.
- Describe the major characteristics associated with viruses, bacteria, fungi, protozoa, and multicellular parasites.
- Understand the influences of various environmental conditions that affect the growth of microorganisms.
- Identify physical and chemical agents used to control microorganisms.
- Understand the pathways of disease transmission, and the influencing factors and properties of pathogens.
- Identify and differentiate between the characteristics of the various body defenses to disease.
- Understand the administrative practices, conditions, and frequencies of communicable disease identification and reporting.
- Understand appropriate public health investigation and control measures for various communicable diseases.
- Interpret selected laboratory test results as they are applied to disease identification, infectiousness, reporting, and control.

Target Audience:

***Prerequisite required:**
In order to take this course, students must have successfully completed the *Principles of Epidemiology* course through the NHILPHP or the equivalent (academic course, continuing education training, self-study course). Job experience may also be considered an equivalent (i.e. Infection Control Practitioners, Laboratorians, Public Health Nurses, etc.).

Course Instructors:

Sandra Buseman, MD, MSPH, Medical Director, Manchester Health Department
Richard DiPentima, RN, MPH, Deputy Public Health Director, Manchester Health Department
Joan Kellenberg, MS, MPH, Public Health Specialist, Manchester Health Department
Kim McNamara, BS, Environmental Health Specialist, Manchester Health Department

Reference Books (provided):

Alcamo, I.E., Ph.D; *Schaum's Outline of Theory and Problems in Microbiology*
Heymann, David L., MD; *Control of Communicable Diseases Manual*, Eighteenth Edition

Participant Assessment:

All course participants will be given a pre-test to evaluate the level of subject matter knowledge of the group as a whole. Participants may choose to remain anonymous for the pre-test only. To successfully complete this course, all participants will be required to pass a comprehensive written examination on content covered within the course. Course content will be covered through a variety of media. Listed below are the types of assignments and activities that all participants will responsible to complete.

- Pre-test based on lesson objectives
- Reading assignments
- Case-study analyses
- Group activities
- Multimedia outbreak investigation
- Post-test based on lesson objectives
- Course evaluation based on competencies and course objectives

Course Overview:

LESSON I – What is Communicable Disease Control?

- History of Microbiology
- General Properties of Bacteria
- Bacterial Classification
- Bacterial Reproduction and Growth
- Infection and Disease

LESSON II – Viruses, Fungi, Protozoa, and Multicellular Parasites

- Foundations of Virology
- Characteristics of Viruses
- Detection of Viruses
- Control of Viruses
- Characteristics of Fungi and Yeasts
- Characteristics of Protozoa
- Characteristics of Multicellular Parasites: Worms and Flukes

<u>LESSON III</u> – Disease, Resistance, and Serology

- Resistance to Disease
- Immunology
- Serology
- Reporting of Communicable Diseases – NH Statutes and Administrative Rules
- Review Outbreak Investigation Algorithm

<u>LESSON IV</u> – Transmission of Communicable Diseases through Person-to-Person, Blood/Body Fluid/Direct Contact

- ➢ Contact Tracing
- *Chlamydial Infections*
- *Gonorrhea*
- *Syphilis*
- *Human Immunodeficiency Virus*
- *Hepatitis B*
- *Herpes Simples Virus*
- *Human Papilloma Virus*

<u>LESSON V</u> – Transmission of Communicable Diseases through Air, Droplets, and Droplet Nuclei

- *Measles*
- *Varicella*
- *Influenza*
- *Neisseria meningitidis*
- *Pertussis*
- *Tuberculosis*
  - ➢ Case Scenario Exercise

<u>LESSON VI</u> – Transmission of Communicable Diseases through Food and Water Supplies

- ➢ Taking a Food History
- Bacterial Diseases
  - *Shigella sp.*
  - *Campylobacter*
  - *E. Coli (Shiga toxin producing)*
  - *Yersinnia*
  - *Listeria*
  - *Clostridium perfringens*
  - *Bacillus cereus*
  - *Salmonella Sp.*
    - ➢ Case Scenario Exercise
- Viral Diseases
  - *Hepatitis A*
  - *Norwalk-like*
- Food Intoxications
  - *Staphylococcus*
  - *Botulism*
  - *Paralytic Shellfish Poisoning*

- *Ciguatera Fish Poisoning*
- *Scombroid Fish Poisoning*

- Protozoal Diseases
  - *Giardia*
  - *Cyclospora*
  - *Cryptosporidium*
- Multicellular Parasite Diseases
  - *Trichinella*
  - *Taenia sp.*

<u>LESSON VII</u> – Transmission of Communicable Diseases through Animals and Vectors

- Zoonotic Diseases
  - *Anthrax*
  - *Leptosporosis*
  - *Psittacosis*
  - *Rabies*
    - Case Scenario Exercise
- Vectorborne Diseases
  - *Lyme Disease*
  - *Rocky Mountain Spotted Fever*
  - *Babesiosis*
  - *Ehrlichiosis*
  - *West Nile Encephalitis*
  - *Plague*
  - *Typhus*
  - *Tularemia*

LESSON VIII – Emerging Issues & Global Concerns

- Emerging Issues
  - Bioweapons
  - Antibiotic Resistance
- Tropical/International Disease of Concern